Geophysical Research Abstracts
Vol. 21, EGU2019-12248, 2019
EGU General Assembly 2019

Impact of Agulhas Current Meanders on water masses along the South-East African shelf and slope

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While the influence of the Agulhas Current on the larger basin and global-scale circulation and climate has been extensively studied, much less research effort has been focussed on the impacts of the Agulhas Current on its adjacent shelf system. In particular, *in situ* sampling along the South-East African shelf has been conducted at either a very coarse spatial resolution, or along single transects, or has been limited to more focussed bay-scale studies. Two recent hydrographic surveys of the South-east African shelf and slope during January/February and July/August 2017, provide the first high-resolution shelf-wide observations of the region. During each survey, a cyclonic eddy associated with a large solitary Agulhas Current meander (commonly referred to as Natal Pulses) was observed to modify surface, central, and intermediate water masses on the shelf and slope. Satellite altimetry indicated that the core of the January/February 2017 cyclonic eddy was located along the 2000 m isobath, with its inshore limb roughly along the 1000 m contour. This eddy resulted in substantial uplift of colder, nutrient-rich central ($<$15 ˚C; 26.4 $<$ γ^n $<$ 27.0 kg m^{-3}), and intermediate ($<$9 ˚C; $>$27.0 kg m^{-3}) waters onto the shelf. While such eddies have previously been associated with the uplift of central waters, this study provides the first evidence of intermediate water uplift, with intermediate waters observed as shallow as 100 m. Further offshore, along the continental slope, clear separation between intermediate waters was evident for the first time, with Antarctic Intermediate Water (AAIW) occurring within the eddy and Red Sea Water (RSW) observed at stations outside of the eddy's influence. In contrast, the July/August cyclonic eddy was much larger, with its core located beyond the 3000 m isobath and its inshore limb along the 2000 m contour. Despite its larger size and stronger intensity, the July/August cyclonic eddy appeared to have much less influence on shelf waters, with only central waters ($<$15 ˚C) being uplifted onto the shelf. Although there was less distinction between AAIW and RSW along the slope during July/August 2017, larger proportions of AAIW were once again observed at stations within the eddy, while larger proportions of RSW were observed outside the eddy.